

An Experiment Of Mathematics Teaching Using SAVI Approach And Conventional Approach Viewed From The Motivation Of The Students Of Sultan Agung Junior High School In Purworejo

Mujiyem Sapti & Suparwati

*Department of Mathematics Education
Muhammadiyah University of Purworejo
KHA. Dahlan 3 Purworejo, e-mail: saptimoedji@yahoo.com*

Abstract

The objective of this research is to investigate whether Mathematics teaching using SAVI approach can make better achievement in learning Mathematics than conventional approach viewed from the student's motivation of Sultan Agung Junior High School in Purworejo on the circle material. This research is a quasi experimental research with 2×3 factorial design. The subject of the research is the 8th-grade students of Sultan Agung Junior High School in Purworejo in the academic year 2010/2011. The sample of this research are 60 students which consist of experimental group and control group. The data were collected by using test of learning achievement in Mathematics and a questionnaire of student's motivation. The test instruments were validated by expert. In the pre-requisite test, analysis variance precondition test using Liliefors test for normality and Bartlett test for homogeneity test. With $\alpha = 0,05$, samples come from normal distributed population and homogeneous. The hypothesis testing using two-way ANAVA with different cell with $\alpha = 0,05$. It shows: (1) $F_c = 4.378 > F_t = 4.024$, it means Mathematics teaching using SAVI approach gives a better achievement in learning Mathematics than using conventional approach; (2) $F_c = 20.822 > F_t = 3.174$, it means the achievement in learning Mathematics of the students who have higher motivation is better than those who have lower motivation; and (3) $F_c = 1.617 < F_t = 3.174$, it means the difference characteristic between the Mathematics teaching using SAVI approach and conventional approach for every students' motivation in learning Mathematics is the same.

Key Words: Mathematics Teaching, SAVI, Motivation

I. INTRODUCTION

1. Background

Science and technology are required to improve the quality of human resources (HR). The efforts to improve human resources are done by the learning process in educational institutions. Nowadays, there are many problem occurred in Indonesia education. One of them is low quality of education and lack of awareness in learning.

The success of the learning process is influenced by internal and external factors. Internal factors are everything come from inside of the student, for example: intelligence, interests, motivation, self-concept, the ability to start and so on. External factors are everything comes from outside of the student, such as: curriculum, teaching

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methods, learning model, approach to learning, social, economic and so forth. Lack of motivation to study causes them facing difficulties in learning Mathematics. So, their Mathematics learning achievement is not good. Teachers are expected to provide learning experiences in the learning process so it can raise interest and motivation. The teacher have to try to eliminate that Mathematics is boring. They may have bad experience in learning Mathematics but not the science itself.

Learning approach is the way in which the implementation of the concept of learning can adapt course material to students. Essentially, the learning approach is a means to achieve learning goals and can develop and enhance the learning activities of teachers and students. Recently, most of teachers use the conventional approach. The conventional approach requires more teacher's activity than student's activity.

To increase motivation, attention, comprehension and student achievement, teachers can use the "SAVI" (somatic, auditory, visual, intellectual) approach. The element of this learning involves the whole activity. Somatic movement related to activity or act. This means learning to move and act. Auditory related to activities of speaking and listening. Visual activity related to observing and describing. Intellectual activities related to the thinking that is by solving problems and thinking. Learning Mathematics can be optimal if the four elements of SAVI are in one event learning in Mathematics.

Many researches have been conducted in order to improve the quality of learning Mathematics. Puji Purwaningsih (2004) examined the differences between the using of the CTL method with conventional methods of learning achievements in economic MTS Muhammadiyah Donorejo, Secang, in Magelang regency. The results showed that there is a significant difference between learning achievement before using CTL and after using CTL. Riawan Yudi Purwoko(2010) conducted research on learning Mathematics with a realistic method of the invention in terms of creativity of students studying Mathematics. The hypothesis testing use two-way ANAVA with a different cells with $\alpha = 0.05$, it showed that: 1) realistic mathematical learning by discovery methods produce Mathematics learning achievement better than the expository method of use in the subject area and volume; 2) the Mathematics learning achievement of the students who have higher creativity is better than those who have lower creativity, and

3) the difference characteristic between the Mathematics realistic teaching using discovery method and expository method for every student's creativity in learning Mathematics is the same. It means that Mathematics realistic teaching using discovery method is better than the expository method reviewed from each student's creativity in learning Mathematics. Erni Puji Astuti (2011) performed the experiment of cooperative learning, Jigsaw and Team Assisted Individualization (TAI), in terms of multiple intelligences Junior High School students in the District of Purworejo. The results showed that: 1) Jigsaw type model of cooperative learning produces better learning achievement than TAI model, 2) the type of logical-mathematical intelligence, linguistic intelligence types and other types of intelligence had no effect on student Mathematics achievement, 3) Jigsaw type model of cooperative learning produces better Mathematics learning achievement than TAI type in every type of students multiple intelligences; 4) on the type of Jigsaw cooperative learning model, students with the type of logical-mathematical intelligence, linguistic intelligence types and other types of intelligence produce the same Mathematics learning achievement, and 5) on the TAI type cooperative learning model, students with the type of logical-mathematical intelligence, linguistic intelligence types and other types of intelligence produced the same Mathematics learning achievement.

2. Formulation of the Problem

From the background, the problem of the research can be formulated as follow:

- a. whether Mathematics teaching using SAVI approach generate learning achievement better than using conventional approach;
- b. whether the achievement in learning Mathematics of the student who have higher motivation is better than those who have lower motivation; and
- c. whether the student's achievement in learning Mathematics using SAVI approach and conventional approach are always consistent for every student's motivation on the circle material.

3. Goal and Benefit of the Research

The objective of this research is to investigate whether Mathematics teaching using SAVI approach can make better achievement in learning Mathematics rather than using conventional approach viewed from the student's motivation of Sultan Agung Junior

High School in Purworejo on the circle material. This research makes students get a different learning experience than usual. Teachers gain experience of other learning activities. So, they can create better learning activities.

II. RESEARCH METHOD

This research was conducted in Junior High School Sultan Agung Purworejo, in the second semester of class VIII student in academic year 2010/2011. This research was conducted from January to June 2011. This research is a quasi experimental research with 2×3 factorial design. The subject of the research is the 8th-grade students of Sultan Agung Junior High School in Purworejo in the academic year 2010/2011. The samples of this research are 60 students which consist of experimental group and control group. The data was collected using a test of Mathematics learning achievement and a questionnaire of student's motivation. The test instruments were validated by expert. In the pre-requisite test, analysis variance precondition test using Liliefors test for normality and Bartlett test for homogeneity test. With $\alpha = 0,05$, samples come from normal distributed population and homogeneous.

The hypothesis testing use two-way analysis of variance with unequal cells. This research uses ANAVA as it aims to test whether there is any difference in the effect of some treatments (factors) on the dependent variable. In this research there are two independent variables studied its effect on the dependent variable, namely the teaching approach and learning motivation, so the analysis of variance used is ANAVA two ways. Because the frequency of each cell is not equal, therefore ANAVA used is not the same cell. ANAVA can be used only if each independent variable and the dependent variable scale are nominal (Budiyo, 2004:184). In this research, the variable of learning motivation is a nominal variable that has three values that is "low", "medium", and "high"; as well as a learning approach variable is also a nominal variable, namely "SAVI" and "conventional". If the null hypothesis is rejected, then it performed a double comparative as a follow-up analysis of variance. Advanced test after analysis of variance method was used Shcefee(Budiyo, 2004:201).

III. RESULT

The data on students' motivation is obtained from the questionnaire. Then the data are

classified into three categories based on the mean and standard deviation. We describe two subjects of this research below.

Table 1
Student's Learning Motivation Category

Category	Control Group	Experimental Group
Low ($X < \bar{X} - SD$)	11	6
Medium ($\bar{X} - SD < X < \bar{X} + SD$)	14	16
High ($X > \bar{X} + SD$)	5	8

From the table, it can be seen that in the control group contains 11 students who have low motivation, 14 students who have medium motivation, and 5 students who have high motivation. In the experimental group, there are 6 students who have low motivation, 16 students who have medium motivation and 8 students who have high motivation.

The result of student's learning achievement test is presented in the following table.

Table 2
Student's Learning Achievement

Group	Max	Min	Mean	SD
Experimental	10.0	3.3	6.057	1.4623
Control	7.3	3.3	5.173	0.9526

Normality test used to determine whether the distribution of the data is normal or not. Based on the results of normality test, then we obtained normality test in the following table.

Table 3
Normality Testing

Source	Significant Value	α	Keputusan	Conclusion
Conventional Approach	0.157	0.05	Sig> α	Normal
SAVI Approach	0.252	0.05	Sig> α	Normal
Low Motivation	0.113	0.05	Sig> α	Normal
Medium Motivation	0.060	0.05	Sig> α	Normal
High Motivation	0.215	0.05	Sig> α	Normal

Normality test showed that the value of Sig.(2-tailed) each factor was more than 0.05. Thus the data are normally distributed. Homogeneity test carried out by looking at the

probability bartlet test with a significance level of 5% (0.05). From the data's analysis we obtained:

- the value of Sig. Based on Mean to test the homogeneity of the sample learning achievement based learning approach at $0.075 > 0.05$,
- the value of value Sig. Based on Mean to test the homogeneity of the sample learning achievement based on motivation to learn for $0.250 > 0.05$.

Thus the subject has the same variance so that one ANAVA assumptions are suit for using. Therefore hypothesis testing can proceed.

The test of hypothesis in this research used two-way ANAVA. This method is used to see a difference between learning achievement based on students' motivation level (high, medium, and low) with SAVI and Conventional learning approaches. The hypothesis proposed are:

- H_{OA} : there is no differences in Mathematics learning achievement on the circle material using SAVI approach and conventional approach;
- H_{OB} : there is no differences in Mathematics learning achievement on the circle material in terms of students' motivation;
- H_{OAB} : there is no interaction between learning approaches and students' motivation toward student's Mathematics learning achievement on the circle material.

Student's data achievement presented in the following table.

Table 4
Student's Learning Achievement

Learning Approach	Motivation		
	Low	Medium	High
SAVI	5.3, 4.0, 3.3, 4.0, 5.3, 5.3	5.3, 6.0, 5.3, 5.3, 6.0, 6.7, 5.3, 6.0, 5.3, 6.7, 6.7, 4.0, 6.0, 7.3, 7.3, 4.7	8.7, 8.0, 7.3, 6.0, 10.0, 7.3, 7.3, 6.0
Conventional	4.0, 4.7, 3.3, 3.3, 4.0, 4.7, 4.7, 4.7, 6.0, 5.3, 5.3	4.7, 5.3, 5.3, 4.7, 6.0, 4.0, 5.3, 5.3, 6.0, 5.3, 4.0, 6.0, 6.0, 6.0	6.0, 6.0, 5.3, 7.3, 6.7

The results of two-way analysis of variance (with unequal cell) are presented in the following table.

Table 5
Summary Analysis of Variance

Source	JK	Dk	RK	F _{obs}	F _α	Decision
Learning Approach(A)	5.008	1	5.008	4.378	4.024	H ₀ rejected
Motivation(B)	47.640	2	23.82	20.822	3.174	H ₀ rejected
Interaction(AB)	3.701	2	1.850	1.617	3.174	H ₀ accepted
Error	61.805	54	1.144	-	-	-
Total	118.154	59	-	-	-	-

The table shows that:

- In the main effects of line (A), H₀ is rejected. It means that students treated using SAVI learning approach has a different Mathematics learning achievement than students who were not treated.
- In the main effect of column (B), H₀ rejected. It means that students with different types of motivation have different Mathematics learning achievement.
- In the interaction effect (AB) H₀ received. It means that differences in learning Mathematics achievement of each learning model is consistent in each type of motivation.

IV. DISCUSSION

1. First Hypothesis

Judging from the learning approach used that are SAVI approach and conventional approach, there are significant differences between learning achievement on the circle material in term of differences in the use of learning approaches. It can be seen from the results of the analysis that shows the value of F calculated > F table. Student achievement using SAVI approach has a higher average than student achievement using the conventional approach. It means that Mathematics teaching using SAVI approach resulting a better achievement in learning Mathematics than using conventional approach.

The differences between the two methods are also supported by the circumstances occurred in the field. In learning using conventional approach, students tend to be more passive though there are some students who sometimes want to ask the teacher. Students

are less enthusiastic when doing practice questions are given, they tend to wait for an answer from friends or teacher. In the Mathematics learning using SAVI approach, students are more active in working on individual tasks. Students are also more willing to ask the teacher, because it is supported by a relaxed learning atmosphere. The circle material would be more easily understood if they directly seeing the circle objects. Nevertheless, students still need guidance from teachers to learn the circle material. The difference of both methods can also be seen from the average value of students' test scores. The experimental group scores better than the control group, namely 6,057 for the experimental group and 5,173 for control group. The average value of the circle material on the experimental group is not match with the expectations of researchers. Researchers see there are weaknesses in the implementation of learning. For example properties used are very simple.

2. Second Hypothesis

From the analysis, there are differences in learning achievement in the circle material in terms of students' motivation. It can be seen from the value of F calculated $> F$ table. Students with high motivation to study have better learning achievement than those with low motivation. It is due to students with high motivation has a high enthusiasm for learning Mathematics. Whereas students with low motivation in learning Mathematics are reluctant, less interested in studying Mathematics and look at learning Mathematics is boring stuff. Learning achievement test scores showed that most students who have high motivation have a high learning achievement, students who have medium motivation have medium learning achievement, and low-motivated students have a low learning achievement. It means that the achievement in learning Mathematics of the students who have higher motivation is better than those who have lower motivation.

3. Third Hypothesis

The analysis showed that there was no interaction between learning approaches and students' motivation with Mathematics learning achievement. It can be seen from the value of F calculated $< F$ table. It means that the level of student motivation and teaching methods collectively did not provide a significant difference to the Mathematics learning achievement. So, the average of student achievement of the experimental group was always higher than the control group students, for the three

learning motivation: high, medium, or low. The difference characteristic between the Mathematics teaching using SAVI approach and conventional approach for every student's motivation in learning Mathematics is the same.

V. CONCLUSION AND SUGGESTION

1. Conclusion

Based on the analysis and discussion, the researchers obtained the following conclusion:

- a. There are differences in learning achievement in the circle material in terms of differences in the use of teaching approaches. The value of F calculated = $4,378 > 4,024 = F$ table, this means SAVI teaching approach is better in increasing the students' mark on the circle material so that the learning achievements gained higher. It can be seen from the average of learning achievement for the experimental group are 60,57 and 51,73 for control group. So, Mathematics teaching using SAVI approach resulting a better achievement in learning Mathematics than using conventional approach.
- b. There are differences in learning achievement in the circle material in terms of students' motivation. Value of F calculated = $20,822 > F$ table = $31,74$ which means that students who have high motivation to learn will have a high learning achievement, student who have medium motivation will have medium learning achievements, and students who have low motivation to learn will have a low learning achievement.
- c. There is no interaction between learning approach and level of students' motivation to learn mathematics achievement on the circle material. It can be seen from the value of F calculated = $16,17 < F$ table = $31,74$ which means that the teaching approach and level of student's learning motivation collectively does not yield significant gains toward Mathematics learning achievement. So, the difference characteristic between the Mathematics teaching using SAVI approach and conventional approach for every student's motivation in learning Mathematics is the same.

2. Suggestion

Based on the conclusions of the study, researchers present the following suggestions:

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- a. In teaching and learning activities, teachers should adapt learning approaches to the material presented. SAVI is appropriate approach when it is used on the circle material because this approach helps students to understand the circle material easier.
- b. A different student's motivation give a different effect on Mathematics achievement in the circle material. Therefore teachers should carry out the learning that raises students' motivation.
- c. The weakness of this research is the props used are very simple. Subsequent researchers should use better props to better motivate students' learning.

VI. BIBLIOGRAPHY

- Budiyono. (2000). *Statistika Dasar untuk Penelitian*. Surakarta: FKIP UNS Press.
- Erni Puji Astuti. (2011). *Eksperimentasi pembelajaran kooperatif tipe Jigsaw dan Team Assited Individualization (TAI) ditinjau dari kecerdasan majemuk siswa SMP Negeri di Kabupaten Purworejo*. Thesis Magister, unpublised, Universitas Sebelas Maret Surakarta.
- Herdian.(2010). *Model Pembelajaran SAVI*. Online. Available at: <http://herdy07.wordpress.com/2009/04/22/model-pembelajaran-SAVI/>. Accessed: 12 Desember 2010.
- Ketut Juliantara. (2011). *Motivasi dan Minat Belajar Siswa*. Online. Available at: <http://edukasi.kompasiana.com/2010/04/11/motivasi-dan-minat-belajar-siswa/> Accessed: 11 April 2011.
- Nana Syaodih Sukmadinata. (2007). *Landasan Psikologi Proses Pendidikan*. Bandung: Rosda.
- Puji Purwaningsih. (2004). *Perbedaan antara penggunaan metode CTL dengan metode konvensional terhadap prestasi belajar IPS Ekonomi pada MTs Muhammadiyah Donorejo Secang Kabupaten Magelang*. Thesis graduate unpublished. Universitas Muhammadiyah Purworejo.
- Riawan Yudi Purwoko. (2010). *Eksperimentasi pembelajaran matematika realistik dengan metode penemuan ditinjau dari kreativitas belajar matematika siswa*. Thesis magister, unpublished. Universitas Sebelas Maret Surakarta.
- Roebyarto. *Pendekatan SAVI*. (2011). Online. Available at: <http://roebyarto.multiply.com/journal/item/21>. Accessed 21 Desember 2010.
- Rose, Colin and Malcolm J. Nicholl. (2002). *Accelerated Learning for the 21st century: Cara belajar cepat abad XXI*. Translated by Dedi Ahimsa. Bandung: Nuansa.